

## Translation

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### DESCRIPTION

#### Hairbrush

The invention relates to a hairbrush comprising a handle and a head portion.

Surface lasers are known for cosmetic or medical treatment, wherein a head  
5 portion comprises several laser diodes arranged in an array. The head portion has  
several openings, behind each of which the active area of one laser diode is placed.

When treating the hair of the head, such surface lasers do not permit the  
desired simultaneous treatment of the scalp, because the laser light is deflected by  
the hair.

10 Thus, the problem to be solved by the present invention is to provide a kind of  
hairbrush which allows a medical or cosmetic treatment of the hair and the scalp with  
laser light.

According to the present invention, the above-mentioned hairbrush is provided  
with an electronic circuit mounted inside the head portion and having a plurality of  
15 laser diodes are arranged in a plane array, wherein the light emitting aperture of each  
laser diode is placed in front of the end face of a waveguide which extends like a  
bristle through an opening in the head portion. The result is a laser brush in which the  
waveguides, acting as bristles, smoothen the hair during combing and wherein the  
light emitted from the opening of the waveguides can act directly on the scalp.

20 Preferred waveguides are axially pierced plastic cones or cylinders metal coated  
on their inner surface, which are held at the head portion by a collar engaging behind  
the opening in the head portion.

The hairbrush according to the present invention may further be configured to  
comprise additional red light diodes provided at the head portion to intensively  
25 irradiate the hair of the head, whereas the laser light emitted from the waveguides  
acts on the scalp.

The dependent claims relate to preferred embodiments of the invention.

The invention is hereinafter described in detail with respect to the embodiment  
shown in the attached drawing.

30 In the drawing,

Fig. 1 is a schematic side view of a hairbrush;

Fig. 2 is a schematic sectional view through part of the head portion of the hairbrush according to Fig. 1; and

Fig. 3 is a view of the head portion of the hairbrush according to Fig. 1, seen from below.

5        The hairbrush according to Fig. 1 comprises a slim handle 2 which is continued in the forward direction by the head portion 4, offset by a slight downward curvature. In a plane view, the head portion 4 is rectangular and the handle is slightly tapered towards its rear end. Not shown is an electric power cord which exits from the rear end of the handle 2 for supplying the electronic circuit disposed inside the hollow  
10 hairbrush with electrical energy.

      The electric circuit 10 comprises a circuit board 12 on which the elements 14, 16, 18 are held and electrically wired. The circuit elements comprise laser diodes 20 having their laser light output windows 22 exposed at the lower side of the head portion 4.

15        A cooling plate 24 is disposed between the circuit board 12 and the lower side 6 of the head portion 4. The circuit board 12 and the cooling plate 24 are screwed on posts 26 protruding from the inner surface of the lower side 6. The cooling plate 24 is in contact with the metallic housing 28 of the laser diode and has openings which leave the light output opening 22 free.

20        For each laser diode 20, a waveguide 30 is held between the cooling plate 24 and the lower side 6. The waveguide 30 consists of a plastic cone having a broadened base 32 bearing on the inner surface of the lower side 6. The first cylindrical part 34 of the cone extends through a respective opening 8 in the lower side 6. The cylindrical part 34 is followed by an outward and radially inward tapering  
25 conical part 36 which, in an embodiment of the invention, ends in a stub about 1.5 cm outside the lower side 6. The waveguide is axially pierced to form a channel 38 which is metal coated on its inside. The output opening 22 of the laser diode 20 is placed in front of the inlet opening of the waveguide. Thus, during operation, the light emitted by the laser diode 20 through the opening 22 can freely exit from the  
30 opposite end of the channel 38.

      As can be seen in Fig. 3, a total of ten laser diodes are arranged in an array 50 on the lower side 6 of the head portion 4, the array having three rows with three, four, and three laser diodes, of which the waveguides 41, 42, 43, 44, 45, 46 and 30 are designated in Figs. 1 and 3. All waveguides and laser diodes are of the same  
35 type.

      In the four corner regions of the array 50, further openings are provided in the lower surface, through which intensive red light emitting diodes 40, 47, 48, 49

protrude partially, with their glass bodies extending only up to a distance of approximately 5 mm to the lower surface 6.

This allows for cosmetic treatment of hairy body parts by intensively irradiating the hair by means of the red light diodes and at the same time stimulating the skin  
5 below by laser light exiting from the channels 38 of the waveguide 30.

#### **CLAIMS**

1. A hairbrush with a handle and a head portion, characterised in that an electronic circuit (10) including a plurality of laser diodes (20) arranged in a plane array (40) is mounted in the head portion (4), wherein the light output opening (22) of each laser diode (20) is placed in front of the end face of a respective waveguide (30) which extends through an opening (8) of and in front of the head portion (4).
2. The hairbrush according to claim 1, characterised in that each waveguide comprises an axially pierced cone or cylinder made of plastic held in the head portion (4) and having a metal coated inner surface.
3. The hairbrush according to claim 1 or 2, characterised in that there are further openings for red light diodes (40, 47, 48, 49) provided in the head portion (4).